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ABSTRACT

The study was designed to measure attitude change of parents of Intermediate Science Curriculum Study (ISCS) students by providing supplemental reports which assessed the behavioral objectives accomplished by the students. The population involved in the study consisted of 385 seventh-grade ISCS students at Roosevelt Junior High School, Williamsport, Pennsylvania, with the treatment group comprised of all of one teacher's students and the control group comprised of the parents of another teacher's students. The Individual Report of Accomplishments in Science (IRAS) was used during the six marking periods and followed up by administering an Additional Reporting Questionnaire and a Likert scale to the parents. The research design was to posttest the parents' responses to the Additional Reporting Questionnaire using chi-square. The results indicated that the IRAS systems did produce significantly more favorable attitudes toward communication of student accomplishment and a more favorable attitude toward the science program. (Author/BR)

The Pennsylvania State University

The Graduate School

Division of Academic Curriculum and Instruction

A Study of Parents' Attitudes Toward Supplemental Report Cards Which Identify Objectives Accomplished By ISCS Students.

A Master's Paper in

Secondary Education

by

Harry Vincent Bardsley, Jr.

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Education

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Date of Approval:

_____

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Associate Professor of Education

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TABLE OF CONTENTS

Chapter 1

INTRODUCTION

One of the curricula generated by the federally sponsored writing projects of the 1960's is the Intermediate Science Curriculum Study (ISCS). ISCS is a hands-on, individualized, self-paced science curriculum designed for junior high school students. The ISCS student works at his own pace along a story line. Excursions, keyed departures from the story line, are used more extensively in the second and third levels of ISCS. In level one (1), with which this study is concerned, there are only remedial or open ended excursions. None of the excursions in level one can make a basic change in the story line.

Bloom (1968) suggests that approximately ninety percent of the students in school can master the objectives of their courses if given sufficient time. ISCS, because it is self-paced and therefore is designed to produce a high percentage of success among students, is not appropriately graded by the usual normative reference.

To effect mastery within a self-paced course ISCS provides mastery tests in the form of self evaluation checks.

ISCS, then, is a course with more than knowledge level objectives. In addition, there are the higher cognitive, affective, manipulative and social skills which provide much more information about student learning than usually provided on a "report card."

Need for the Study

Any inservice teacher is in contact with the parents of his students. This contact is either a direct form of exchange, or indirect, as an interpretation through the eyes of his students or a letter grade on a report card. Increasing direct contact with parents is an adequate way to further communication between the teacher and parent. Time alone makes direct contact with all parents impossible for the teacher. Yet there is a broad spectrum of information that can and should be communicated among parents and teacher which is totally impossible with only a sterile letter grade transmitted on a six or nine weeks formal report. The problem is compounded by achievement of different amounts of material by the respective students in a self-paced program.

In an effort to increase communication with parents of Level 1 ISCS students at Roosevelt Junior High School, the seventh grade science teachers adopted a modified form of the 7th Grade Science Student Progress Report developed by DeRose (1972).

The modification, now entitled Supplemental Report of Pupil Progress (Appendix A) has been extremely helpful in communicating information in a broad area loosely called "work habits." Nonetheless, the Supplemental Report does not answer the central question asked of ISCS teachers at Roosevelt Junior High School during conferences with parents. That question was: "What is my child learning?"

Direct contact with parents solved this problem when the question was asked. Many parents, for whatever reasons, were not asking the question and consequently were not getting the information.

Statement of Problem

The purpose of this research was to develop and evaluate the effectiveness of a reporting system to parents which would transmit information about the accomplishments of their child in science.

Many considerations must go into the development of such a reporting system. Among the main considerations are the following:

1. Provision for reporting of each child's progress within the self-paced course.

2. Description of the course in terms which parents can easily understand.

3. Effectiveness both in terms of teacher time and

cost to the school district.

Definition of Terms

1. Accomplishment: a behavioral objective which has been mastered by a student. (Examples are found in Appendix C.)

2. Individual Report of Accomplishments in Science (IRAS): computer printout of the accomplishments of each student which is sent home to parents at the end of each six weeks marking period. (Appendix C)

3. Objective Reporting: reporting of facts as defined by mastery of an objective or objectives, e.g., "Your child can measure....." or reporting of a series of many subjective evaluations, in anecdotal form, which have become data, e.g., "works well with others as shown by eight out of ten observations of child working cooperatively with peers."

4. Subjective Reporting: reporting of grades which, although they may be based on data, are not criterion referenced, e.g., "satisfactory," "A," or "98%," none of which describe the standards on which the judgement is based.

5. Supplemental Report of Pupil Progress: a report to parents detailing a student's work habits during a six weeks marking period. (Appendix A)

6. Supplemental Reports: collectively the Supplemental Report of Pupil Progress and IRAS.

Limitations of Research

1. This study was limited to the parents of 385 seventh grade ISCS students at Roosevelt Junior High School, Williamsport Area School District.

2. To avoid difficulties caused by differing treatments within the group of parents of one teacher and to meet the need of informing parents about accomplishments in science, the treatment was applied to parents of one teacher's students and the control group was comprised of the parents of another teacher's students.

3. Students were assigned to sections randomly, and each teacher had a representative cross section of ability groups. However, no attempt was made to test the homogeneity of parents across treatment groups.

4. The Individual Report of Accomplishments in Science had been used over four marking periods at the time of the evaluation; therefore, contamination across treatments was possible. No estimates of the degree of treatment contamination were available.

Chapter 2

REVIEW OF THE LITERATURE

In preparation for studying the attitudes regarding communication of accomplishments in science to parents of 7th grade ISCS students at Roosevelt Junior High School, Williamsport, Pennsylvania, a review of the literature was carried out by the investigator to accomplish the following:

1. To determine if similar studies of parental attitude had been pursued in the past.

2. To obtain research material relative to:

   a. Reporting of pupil progress

   b. Empirical data on parental attitudes regarding grade reporting.

Major Sources Consulted

1. Dissertation Abstracts
   University Microfilms, Inc.
   Ann Arbor, Michigan

2. Education Index
   The H. W. Wilson Company
   New York, N. Y.

3. Encyclopedia of Educational Research
   The American Education Research Association, N.E.A.
   The MacMillan Company
   New York, N. Y. 1969

4. ERIC: Research in Education
   Educational Resources Information Center
   1126 Sixteenth Street, N.W.
   Washington, D. C.

5. Reader's Guide to Periodical Literature
   The H. W. Wilson Company
   New York, N. Y.

Time Limits of Survey

The Dissertation Abstracts were reviewed from 1968 through June, 1974. The Education Index and Reader's Guide were reviewed from 1958 until June, 1974. ERIC was reviewed from 1960 until May, 1974.

Most Helpful Studies

Historically, Strang (1947) described various grade reporting schemes in use through 1946. Reporting practices of the high school level were classified into categories by Wrinkle (1947). Research by the National Education Association (1968) showed that the two most common methods of reporting to parents were letter grades and teacher-parent conferences.

Brodinsky (1972) reported data gathered from a nationwide survey of school districts. The report included a broad sample of reporting forms. Brodinsky divided reporting of pupil performance into three levels. The first, on traditional level, included all reporting systems utilizing grades, either percentage or A-C letter grades determined

arbitrarily by the teacher from unspecified standards or criteria, regardless of the format or the techincal innovations utilized.

First generation reforms included all of those reports which utilized any descriptive phrases in addition to evaluative symbols, e.g., checklists. Second generation reforms were based on the utilization of behavioral objectives as specific statements which were evaluated in terms of accomplishment. Included in this group were those grading systems which only reported pass/fail.

Communication, as the end product for reporting systems has been discussed by various authors. An argument for multiple grading systems presented by Williams and Miller (1973) suggested that among the functions of a grading system was provision for a summary of skills. In addition, a reporting system must be useful to predict future performance, indicate progress, and finally to accurately summarize the above in a way which can be easily communicated.

Yelon (1970) suggested that the necessary communication could be achieved by statements which listed the skills and attributes of a given individual. Further, it was Yelon's position that skill achievements specification would not only be more precise, but also much less dehumanized than traditional systems.

Mastery of a specific set of skills should require more than the reporting of subjective grading. Indeed, Bloom (1968) suggested further that subjective grades were self-defeating because they instill feelings of inadequacy. Glasser (1969) contended that letter grades below B are demoralizing enough to be classified as failure.

Gagné (reported in Brodinsky, 1972) was quoted in the context of accountability:

> It is somewhat surprising that parents have stood still for grades for such a long period of time considering the deplorably small amount of information they convey. (p. 62)

Gagné continued that a system reporting behavioral objectives was necessary.

Brodinsky (1972) included among the sample reports in his survey several examples of first generation reforms. In addition, two sources were found to be especially relevant: (1) The ISCS Individualized Teacher Preparation Module Evaluating and Reporting Pupil Progress (1972) presented design considerations and other sample reports, and (2) The Student Progress Report, developed by DeRose (1972), included work style indicators in the data reported to parents in a checklist format, e.g., "Makes full use of class time;" "Writes well weighed answers in his record book."

The features necessary for a report of behavioral objectives were outlined by Millman (1970). He included a list of objectives, a check-off space and a cumulative indicator to show progress from previous reports. Among the advantages Millman concluded that:

> The report card format suggested in this paper permits a degree of communication and accountability to the parent not possible with other systems of reporting. Every student will be shown to be learning, and both the parents and student will know better what has been learned and what can now be done. (p. 229)

A complex system for reporting behavioral objectives has been developed by the Dallas Independent School District. A Report to Parents was sent home for each marking period. For each of thirty-eight "Curriculum Areas" there was listed a series of numbers. The last number indicated the child's most recent level of achievement. To reference the encircled number the parent was to refer to a publication entitled Terminal Behavioral Objectives for Continuous Progress Modules in Early Childhood Education (Dallas, n.d.). Further classification was found in the booklet, Your Child Starts School (Dallas, n.d.).

Behavioral objectives are also central to the development of Computer Managed Instruction (CMI) systems. Lists of behavioral objectives, while not reported to parents, are produced by the computer for review by the students and

instructor. Student progress is reported in terms of mastery of the behavior objectives or remedial assignments designed to aid the student in reaching mastery. Singh (n.d.) and Hayman and Mable (1974) discussed the implementation of the Automated Instruction Management System (AIMS) utilized at the Pennsylvania State University to individualize instruction reporting.

Verbal format reporting of achievement test data utilizing a computer was reported by Mathews (1972). Computer printouts in the form of a letter were sent to parents describing their child's progress. In addition, class summaries and reports for individual students were provided for each teacher. In the evaluation, fifty-two teachers picked at random were provided with a questionnaire. In fifteen of eighteen comparisons, the experimental reports were rated higher ($p < .01$) than the traditional reports.

Giannangelo and Lee (1974) outlined Computer Assisted Report to Parents (CARP) which provided anecdotal records in the form of a computer printout report. The authors reported positive feedback from parents although no empirical data were given.

Other examples of similar reports may be found in Brodinsky (1972) under his classification of second generation reforms.

Summary of the Review

Grading and Report Cards have evolved through an unsystematic, nearly trial and error, process. Trends, however, are apparent. Percentage and letter grades which are symbolic summaries of subjective judgements are being questioned. In their place checklists, containing objective summaries of many subjective observations within defined categories, or more recently objective reporting of mastery have emerged. As the method of communication has changed, so has the substance. From the percent of what the teacher deemed to be ideal, a statement of what a child did or could do has become an increasing pattern of reporting.

Communication with the home has been the point of reporting, but little research into the effectiveness of the communication system has been reported in the literature. No empirical data describing parental perception of effectiveness of progress reporting systems were found. Mathews' (1972) study was the closest with teacher-opinion data.

Chapter 3

PROCEDURES

Hypotheses

This study is concerned with increasing communication with parents of 7th grade ISCS students at Roosevelt Junior High School, Williamsport, Pennsylvania. The following null hypotheses were investigated to measure the effect of supplemental reporting on the attitudes of parents who received an Individual Report of Accomplishments in Science.

1. No significant difference ($p < .05$) in parental attitude regarding communication of their child's work habits in science as measured by the Additional Reporting Questionnaire, a Likert scale, was found among parents who received IRAS compared with those who did not.

2. No significant difference ($p < .05$) in parental attitude regarding communication of their child's accomplishments in science as measured by the Additional Reporting Questionnaire, a Likert scale, was found among parents who received IRAS compared with those who did not.

3. No significant difference ($p < .05$) in parental

attitude regarding ISCS and supplemental reporting as measured by the Additional Reporting Questionnaire, a Likert scale, was found among parents who received IRAS compared with those who did not.

The Treatment Used

The primary concern of this study is the increased communication in the area of accomplishments. This led to careful consideration of the following criteria. The criteria may be broken down to four categories; parental, utilitarian, administrative, and general.

Parental Criteria

1. All statements must be positive, i.e., "did's" vs. "did not's." Negativism in the reporting system infers negativism on the part of the teacher which is likely to lead to negativism on the part of parent and student.

2. The report must not have a "checklist" appearance which infers that all children can be summed up to a small number of commonalities. This appearance may be perceived as a "put down."

3. Since ISCS is self-paced, the report must list the accomplishments of the individual child to avoid parental apprehension about incompleted items.

4. The report must be an objective, meaningful statement of progress written in language which parents can understand, i.e., nontechnical as much as possible.

5. The report must reflect a genuine caring for students rather than simply a cold reporting of facts.

6. The end product must produce an increase in trust on the part of parents and produce as little negativism as possible.

Uilitarian Criteria

1. The time required to produce the report for each of the approximately 200 students must not be so great as to be impractical on a long term basis or for general use for more than one teacher.

2. Because of the above and the requirement for individuality, the reporting system must utilize a computer. Therefore, the reporting system must be compatible with the IBM 1401 computer; the IBM Systems 3 computer, the switchover to which was anticipated at the time of the study; other computers; and the format of the data cards used for general report cards in the Williamsport School District.

3. The report must be capable of showing the accomplishments of students doing remedial excursions as well as those on the main story line.

Administrative Criteria

These considerations are somewhat artifical, but were constraints which had to be met if the project were to be financed by the district on an informal basis.

1. The report must have the potential of being adaptable to other curricula.

2. The financial burdens on the district and computer time consumed must not be prohibitive.

3. Any system developed must be suitable for inclusion with the permanent records of a student.

General Criteria

1. The report system must be capable of producing measurable results which could be included in the research.

2. The system should be adaptable for use by other school districts.

The end result of all of the considerations above is the FORTRAN program, the print-out for which is included in Appendix B.

The FORTRAN program developed is most unsophisticated; it was written in this way for two major reasons. First, the restrictions in flexibility found in the IBM 1401's Version 2 Modification 2 FORTRAN had to be observed. Second, written in this fashion the program will not halt the operation of the

computer or delay completion of the program if there were key punching errors on any data card or cards. Mistakes could occur on individual reports but the total computer time could not be extended by a halt.

The data processing department of the Williamsport Area School district supplied a data card at the end of each marking period for each student. Each card was prepunched with the student name and number. The only data which had to be added by key punching were the numbers which referred to the specific statement(s) of accomplishments on the report itself. (Appendix C)

The program and data cards were then run on a batch mode basis. Running time, from compilation to end of printout was approximately 30 minutes for the IBM 1401 and approximately 20 minutes for the IBM Systems 3. The total running time varied for each marking period, the variation due to changes in printing time caused by changes in the total number of objectives accomplished by all of the students.

Cost analysis data were not made available by the school district because costing procedure had not been established for the school districts' System's 3 computer; however, IRAS would cost less than $0.38 per pupil per year to produce using the IBM 360 at the Pennsylvania State University.

Description of Subjects

The subjects were the parents of 385 seventh grade students. All of the subjects reside in the area served by the Roosevelt Junior High School, Williamsport Area School District, Lycoming County, Pennsylvania. This area is extremely varied in population, including urban, suburban and rural residents. No data were taken on general socio-economic status, but the subjects might be generalized as being from the upper middle to the middle lower part of the socio-economic scale.

Experimental Procedure Used to Test Hypotheses

At the end of each six weeks marking period all subjects received a regular report card for their child which reported a letter grade for science. All subjects also received the Supplemental Report of Pupil Progress. (Appendix A)

The subjects in the treatment group received, in addition to the above, the Individual Report of Accomplishments in Science. This procedure was continued for the first four marking periods of the 1973-74 school year.

Upon completion of the treatment an Additional Reporting Questionnaire, a Likert scale (Likert, 1932), and an attached explanatory cover letter were sent to the parents. (Appendix D)

The thirteen statements were placed into the order in which they appear from a list of random numbers so that any given

statement had equal chance of being considered first by the subjects.

Four of the statements were phrased negatively to provide some input as to the care which was taken in reading and responding to them.

The statements on the questionnaire are divided into three subscales. First, those statements dealing with Hypothesis One and the Supplemental Report of Pupil Progress, numbers 2, 5, 7, 11. Second, those statements dealing with Hypothesis Two and the Individual Report of Accomplishment in Science, numbers 1, 4, 9, 10. Third, those statements which were general or did not deal directly with communication from either supplementary report, numbers 3, 6, 8, 12, 13, and which are the objects of Hypothesis Three.

The research design, then, was to posttest the parents' responses to the Additional Reporting Questionnaire using chi-square.

Chapter 4

PRESENTATION AND ANALYSIS OF FINDINGS

The raw data for both the treatment and control group are found in Appendix E. Fluctuations in the total for each statement were due to no response on the questionnaire, extraneous marks or statements with two responses marked.

The sample drawn from the control group, i.e., number of questionnaires returned, was smaller than the sample drawn from the treatment group, therefore, it was necessary to prorate the number of responses in each category of the control group to provide equal cell numbers for the Chi-square Goodness of Fit Test. The sample sizes were equalized using the following formula: $f_{cc} = f_c \times T_t/T_c$

where:

f_{cc} = the corrected control data
f_c = the raw control data
T_t = total for a given statement in the treatment group
T_c = total for a given statement in the control group

Results

The first null hypothesis investigated follows:

No significant difference ($p < .05$) in parental attitude regarding communication of their child's work

habits in science as measured by the Additional Reporting Questionnaire, a Likert scale, was found among parents who received IRAS compared with those who did not.

Hypothesis One was investigated using the first subscale of the Additional Reporting Questionnaire, numbers 2, 5, 7 and 11. Table 1, below, gives each statement and a summary of the Chi-Square Goodness of Fit Test (Garrett, 1972) for the first subscale.

Table 1. Summary of Chi-Square Test for Each Statement in Subscale 1.

2. I feel the reports in science have been helpful to me in understanding my child's work habits.

	SA	A	U	D	SD
o	27	87	14	7	1
e	22	84	20	7	3
o-e	5	3	6	0	2
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	20.25	6.25	30.25	0	2.25
$(o-e)^2/e$	0.92	0.07	1.50	0.0	0.75

$.95\ X^2_4 = 9.49$ $X^2 = 3.24$

5. Because of the reports sent home I had more information about work habits which I could discuss with my child.

	SA	A	U	D	SD
o	5.	15	17	77	27
e	6	12	24	68	30
o-e	1	3	7	9	3
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	0.25	0	0	0	0.25
$(o-e)^2/e$	0.01	0.0	0.0	0.0	0.08

$.95\ X^2_4 = 9.49$ $X^2 = .09$

Table 1 (continued)

7. Because of the reports sent home I talked to my child about the amount of work he or she was doing in science more than I would have without them.

	SA	A	U	D	SD
o	12	83	15	13	2
e	13	70	19	20	3
o-e	1	13	4	7	1
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	0.25	156.25	12.25	42.25	0.25
$(o-e)^2/e$	0.02	2.23	0.64	2.11	0.08

$_{.95}X^2_4 = 9.49$ $\quad X^2 = 6.11$

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11. I feel the reports in science have not been helpful to me in understanding about my child's work habits.

	SA	A	U	D	SD
o	5	15	17	77	27
e	6	12	24	68	30
o-e	1	3	7	9	3
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	0.25	6.25	42.25	72.25	6.25
$(o-e)^2/e$	0.04	0.52	1.76	1.06	0.25

$_{.95}X^2_4 = 9.49$ $\quad X^2 = 3.59$

The second null hypothesis investigated follows:

No significant difference ($p < .05$) in parental attitude regarding communication of their child's accomplishments in science as measured by the Additional Reporting Questionnaire, a Likert scale, was found among parents who received IRAS compared with those who did not.

Hypothesis Two was investigated using the second subscal of the Additional Reporting Questionnaire, numbers 1, 4, 9 and 10. Table 2, overleaf, gives each statement and a summary of the Chi-Square Goodness of Fit Test for the second subscale.

Table 2. Summary of Chi-Square Test for Each Statement in Subscale 2.

1. Because of the reports sent home I feel I know more about what my child is learning in science than I would without them.

	SA	A	U	D	SD
o	38	80	7	10	4
e	27	73	26	8	5
o-e	11	7	19	2	1
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	110.25	42.25	342.25	2.25	0.25
$(o-e)^2/e$	4.08	0.58	13.16	0.28	0.05

$_{.95}X^2_4 = 9.49$ $\quad X^2 = 18.15$

4. The individualized reports have not helped me understand my child's accomplishments in science.

	SA	A	U	D	SD
o	2	16	15	70	36
e	3	18	26	72	20
o-e	1	2	11	2	16
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	0.25	2.25	110.25	2.25	240.25
$(o-e)^2/e$	0.08	0.14	4.24	0.03	12.1

$_{.95}X^2_4 = 9.49$ $\quad X^2 = 16.5$

9. Because of the reports sent home I talked to my child about the things he or she was learning more than I would have without them.

	SA	A	U	D	SD
o	14	88	9	25	1
e	20	74	27	13	3
o-e	6	14	18	12	2
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	30.25	182.25	306.25	132.25	2.25
$(o-e)^2/e$	1.51	2.46	11.34	10.17	0.75

$_{.95}X^2_4 = 9.49$ $\quad X^2 = 26.23$

Table 2 (continued)

10. The individual reports have been helpful to me in understanding my child's accomplishments in science.

	SA	A	U	D	SD
o	22	84	13	17	3
e	10	82	22	21	4
o-e	12	2	9	4	1
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	132.25	2.25	72.25	12.25	0.25
$(o-e)^2/e$	13.23	0.03	3.28	0.58	0.06

$.95\ X^2_4 = 9.49$ $X^2 = 17.18$

The third null hypothesis investigated follows:

No significant difference ($p < .05$) in parental attitude regarding ISCS and supplemental reporting as measured by the Additional Reporting Questionnaire, a Likert scale, was found among parents who received IRAS compared with those who did not.

Hypothesis Three was investigated using the third subscale of the Additional Reporting Questionnaire, numbers 3, 6, 8, 12 and 13. Table 3, below, gives each statement and a summary of the Chi-Square Goodness of Fit Test for the third subscale.

Table 3. Summary of Chi-Square Test for Each Statement in Subscale 3.

3. I would like to receive reports about my child's work habits in other subject areas.

	SA	A	U	D	SD
o	56	59	15	6	1
e	48	69	13	3	3
o-e	7	10	2	3	2
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	42.25	90.25	2.25	6.25	2.25
$(o-e)^2/e$	1.17	1.31	0.17	2.08	0.75

$.95\ X^2_4 = 9.49$ $X^2 = 5.48$

Table 3 (continued)

6. I dislike the science program my child has this year.

	SA	A	U	D	SD
o	9	9	26	65	41
e	5	13	40	53	42
o-e	4	4	14	12	1
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	12.25	12.25	182.25	132.25	0.25
$(o-e)^2/e$	2.45	0.94	4.56	2.50	0.01

$.95\ X^2_4 = 9.49$ $\qquad X^2 = 10.46$

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8. If I had another child in seventh grade next year I would like to receive reports of his work in science similar to this year's reports.

	SA	A	U	D	SD
o	35	91	16	6	3
e	35	85	17	8	6
o-e	0	6	1	2	3
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	0	30.25	0.25	2.25	6.25
$(o-e)^2/e$	0.0	0.36	0.01	0.28	1.04

$.95\ X^2_4 = 9.49$ $\qquad X^2 = 1.69$

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12. I would like to receive reports about the work my child has accomplished in other subject areas.

	SA	A	U	D	SD
o	31	80	17	7	3
e	37	78	15	6	3
o-e	6	2	2	1	0
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	30.25	2.25	2.25	0.25	0
$(o-e)^2/e$	0.82	0.03	0.15	0.04	0.0

$.95\ X^2_4 = 9.49$ $\qquad X^2 = 1.04$

Table 3 (continued)

13. Since the reporting forms and their completion cost money, they should be discontinued because they probably cost more than they are worth.

	SA	A	U	D	SD
o	6	11	33	55	33
e	10	17	30	42	39
o-e	4	6	3	3	6
Yates	(.5)	(.5)	(.5)	(.5)	(.5)
$(o-e)^2$	12.25	30.25	6.25	6.25	30.25
$(o-e)^2/e$	1.23	1.78	0.21	3.72	0.78

$_{.95}X^2_4 = 9.49$ $\qquad X^2 = 1.04$

Reliability

Reliability data were provided by the Complete A.O.V. Reliability Program (RELIB); a library program of the Pennsylvania State University's IBM 360. (Dick, 1965)

The reliability of the Additional Reporting Questionnaire was found to be 0.787 for the control group and 0.428 for the treatment group.

Summary of the Findings

In investigating the three null hypotheses regarding parental attitudes toward increased communication in reporting science progress the following was determined.

1. There was no significant difference ($p < .05$) in parental attitude regarding communication of their child's work habits in four out of four cases, i.e., statements among parents

who received IRAS compared with those who did not.

2. There was a significant difference ($p < .05$) in parental attitudes regarding communication of their child's accomplishments in four out of four cases, i.e., statements among parents who received IRAS compared with those who did not.

3. There was no significant difference ($p < .05$) in parental attitude toward ISCS and supplemental reporting in four of five cases, i.e., statements among parents who received IRAS compared with those who did not.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

Rationale for the Study

The communication to parents of meaningful information regarding their child's accomplishment is an important concern of the ISCS teacher. Therefore, it was important to develop a system which met this need. An evaluation of such a system was also deemed important. To meet these needs, IRAS and a Likert scale, Additional Reporting Questionnaire, to evaluate IRAS were developed.

Results and Conclusions

1. The parents of seventh grade ISCS students did show a significant difference in attitude toward communication of their child's accomplishments in science.

2. The fact that the Chi-Square values were so low for the statements which were common to both the experimental and control groups, i.e., statements 2, 3, 5, 6, 7, 8, 11, 12 and 13 tends to support the assumption that the parent groups were homogeneous.

General Implications

The most obvious implication was that parents (do get and) want more information about their children's progress. This observation was supported by the very high numbers of strongly agree and agree categories which were chosen by both sets of parents responding to statements numbers 3 and 12.

> 3. I would like to receive reports about my child's work habits in other subject areas.
>
> 12. I would like to receive reports about the work my child has accomplished in other subject areas.

The parent's response suggests that similar reporting techniques would be of value to teachers in other subject areas and grade levels.

Some discussion may be pertinent regarding the evaluation of IRAS relative to the design criteria. Many of the following observations are subjective interpretations which are substantiated only in part by the data. Two specific bits of data, however, provide the basis for these interpretations.

First, the total scale mean for the treatment group was somewhat higher than for the control group, i.e., 50.4 as compared with 48.7. Second, the difference in opinion of parents between treatment and control groups found for statement number 6, "I dislike the science program my child has this year" was significant, indicating a more favorable attitude of the group that received the IRAS printouts in addition to the Supplemental Report of Pupil

Progress and reported letter grade.

The fact that parents in the treatment group tend to like the science program more and had a higher mean average suggests the success of the design in meeting the criteria listed under the heading "parental criteria" found on page 14, and the ease with which IRAS can be added to a traditional reporting system.

In summary those considerations were: all positive statements, appearance other than that of a check-list, individualized per child per report period, objective statements written for parents and reflecting a genuine caring for students. The considerations are all compressed into the last consideration; the report must produce trust on the part of parents. This end would seem to have been served.

Teacher time required to key punch approximately 200 data cards was less than forty-five minutes per marking period, some of which was accountable to inefficient key punching skills. Nevertheless, forty-five minutes is less time than it takes to average and record the same number of grades.

IRAS has been run without change on the IBM 1401, Systems 3 and 360. IRAS will run with minimal modifications on any computer with a FORTRAN IV compiler and a minimum of 14K storage.

One of the stated design requirements was the ability

to printout accomplishments which students gained by completing the excursions. Flexibility was also built into IRAS to allow the listing of accomplishments in the order in which they were completed. Examples of these capabilities are found on page 44 in the third and fourth statements, "Your child is able to add, subtract, multiply and divide decimal numbers" is the summary of the work found in excursion 2 of ISCS. "Your child is able to measure distances using metric units correct to .3 centimeters" summarizes the work in excursion 1 of ISCS. This printout shows not only the skills gained by the student in completing the excursions but also the order in which the work was done.

IRAS is suitable for use with any subject or curriculum the content of which can be stated in behavioral objectives and is suitable for inclusion into permanent records, since it consists of statements of tested abilities.

As stated previously, the cost and time requirements for IRAS reporting are minimal and easily within reach of any school district which has computer services.

In summary, since the IRAS systems did produce significantly more favorable attitudes toward communication of student accomplishment, and since IRAS is relatively inexpensive and adaptable to other courses and school situations, and since behavior objectives and mastery learning have become a central part of school curricula; school districts should seriously

consider incorporating this type of reporting as a regular feature of their communications to parents.

Recommendations for Further Study

A review of the literature and the investigation of the hypothesis of this research suggests the following areas for future study.

1. Present reporting systems should be evaluated for effectiveness.

2. Parents should be surveyed to establish the kinds and methods preferred for reporting information about their child's progress, e.g., are systems reporting behaviorial objectives preferred to letter grades, or are both systems complementary and preferable.

3. The significant difference in parental response to statement number 6, i.e., "I dislike the science program my child has this year" suggests there may be a correlation between school-parental communication and confidence in the school curriculum. This may be an especially relevent avenue to pursue in light of the widely reported disaffection of the public with the schools.

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Appendix A

Supplemental Report of
Pupil Progress

SUPPLEMENTAL REPORT OF PUPIL PROGRESS

W.A.S.D.

ROOSEVELT JUNIOR HIGH SCHOOL

_____ Student: _____ Section _____ Year

MARKING PERIOD	1	2	3	4	5	6
NUMBER OF CHAPTERS COMPLETED TO DATE						
NUMBER OF EXCURSIONS COMPLETED TO DATE						
SELF EVALUATIONS COMPLETED TO DATE						
CHAPTER TESTS COMPLETED TO DATE						

A PLUS SIGN (+) MEANS THAT THE STUDENT HAS DONE WHAT IS INDICATED
A ZERO (0) MEANS THAT THE STUDENT HAS NOT DONE WHAT IS INDICATED

MARKING PERIOD	1	2	3	4	5	6
MAKES FULL USE OF CLASS PERIOD TIME						
THOROUGHLY STUDIES PROBLEM BEFORE QUESTIONING						
TALKS QUIETLY AND ONLY WHEN NECESSARY						
USES EQUIPMENT CAREFULLY						
RECORDS DATA IN THE STUDENT RECORD BOOK AS EXPERIMENTING IS DONE						
WRITES LEGIBLY IN THE STUDENT RECORD BOOK						
ANSWERS EACH QUESTION IN THE STUDENT RECORD BOOK IN SEQUENCE						
ANSWERS IN RECORD BOOK ARE APPROPRIATE AND MEANINGFUL						
TAKES TESTS ONLY AFTER MASTERY OF SUBJECT MATERIAL						
TAKES TESTS IN SEQUENCE						

WASD 034

Add a Letter-Signature of Parent

1st _____

2nd _____

3rd _____

4th _____

5th _____

Personal remarks by parent or teacher on reverse side

Appendix B

Individual Report of Accomplishments in Science
FORTRAN IV Program

```
C      THIS PROGRAM PRINTS OUT PROGRAM OF BEHAVIORAL OBJECTIVES WHICH
C      HAVE BEEN ACCOMPLISHED DURING ONE MARKING PERIOD.
C      PROGRAMMED BY H. V. BARDSLEY
C
       REAL*8A(4)
       DIMENSION N(20)
  888  READ(9,222)NA,(A(I),I=1,3),(N(I),I=1,20)
  222  FORMAT(I5,3A5,20I3)
       WRITE(3,666)(A(I),I=1,3),NA
       IF(NA.LT.0)STOP
       DO 777 K=1,20
       M=N(K)
       IF(M.EQ.0)GO TO 888
       IF(M.EQ.1)WRITE(3,1)
       IF(M.EQ.2)WRITE(3,2)
       IF(M.EQ.3)WRITE(3,3)
       IF(M.EQ.4)WRITE(3,4)
       IF(M.EQ.5)WRITE(3,5)
       IF(M.EQ.6)WRITE(3,6)
       IF(M.EQ.7)WRITE(3,7)
       IF(M.EQ.8)WRITE(3,8)
       IF(M.EQ.9)WRITE(3,9)
       IF(M.EQ.10)WRITE(3,10)
       IF(M.EQ.11)WRITE(3,11)
       IF(M.EQ.12)WRITE(3,12)
       IF(M.EQ.13)WRITE(3,13)
       IF(M.EQ.14)WRITE(3,14)
       IF(M.EQ.15)WRITE(3,15)
       IF(M.EQ.16)WRITE(3,16)
       IF(M.EQ.17)WRITE(3,17)
       IF(M.EQ.18)WRITE(3,18)
       IF(M.EQ.19)WRITE(3,19)
       IF(M.EQ.20)WRITE(3,20)
       IF(M.EQ.99)WRITE(3,99)
  777  CONTINUE
       GO TO 888
  666  FORMAT(1H1,35HWILLIAMSPORT AREA SCHOOL DISTRICT  /13H ROOSEVELT JU
      1 1HNIOR HIGH SCHOOL//42H INDIVDUAL REPORT OF ACCOMPLISHMENTS IN SC
      2 25HIENCE//20H TO THE PARENTS OF  3A5 //25H THE FOLLOWING IS A LISTI
      3 62HNG OF BRIEF SUMMARIES OF THE WORK DONE AND ABILITIES GAINED BY/
      4 47H YOUR CHILD DURING THE PREVIOUS MARKING PERIOD.77X,I6)
    1 FORMAT(1HO,52HYOUR CHILD IS ABLE TO TELL IF A TEST BATTERY WHICH HE
      1 63HE MADE IN CLASS HAS INFLUENCE BY TESTING IT IN A SIMPLE CIRCUIT.
      2//61H YOUR CHILD IS ABLE TO DESCRIBE SIMPLE GROUPS OF OBJECTS WHICH
      3 33IHH WORK TOGETHER AS A SYSTEM AND/28H IDENTIFY SUBSYSTEMS AND COM.
      4 48HPONENTS. )
    2 FORMAT(1HO,52HYOUR CHILD IS ABLE TO WRITE AN OPERATIONAL DEFINITIO
      1 58HN -ONE WHICH SHOWS MEASUREMENT OF THE THING BEING DEFINED.//1H
      2 63HYOUR CHILD IS ABLE TO ANSWER QUESTIONS ABOUT RELATIONSHIPS SHOW
      3 18HN IN A DATA TABLE. )
    3 FORMAT(1HO,52HYOUR CHILD IS ABLE TO ADD, SUBTRACT, MULTIPLY AND DI.
      1 21HVIDE DECIMAL NUMBERS. )
    4 FORMAT(1HO,52HYOUR CHILD IS ABLE TO MEASURE DISTANCES USING METRIC
      1 33H UNITS CORRECT TO .3 CENTIMETERS. )
    5 FORMAT(1HO,52HYOUR CHILD IS ABLE TO MEASURE FORCES BY APPLYING THE
```

```
     133H OPERATIONAL DEFINITION OF FORCE./26H -ANYTHING WHICH CHANGES TH
     233HPE SHAPE OR MOTION OF AN OBJECT.  )
   6 FORMAT(1HO,51HYOUR CHILD IS ABLE TO GRAPH DATA FROM A DATA TABLE.)
   7 FORMAT(1HO,52HYOUR CHILD IS ABLE TO MEASURE FORCES IN NEWTONS -THE
     123H METRIC UNIT OF FORCE. //35H YOUR CHILD IS ABLE TO CALIBRATE A
     263HSIMPLE FORCE MEASURING DEVICE SIMILAR TO THE ONE HE USED IN CLA
     33HSS. )
   8 FORMAT(56HOYOUR CHILD IS ABLE TO MEASURE WORK, WHICH IS OPERATIONA
     142HLLY DEFINED AS THE MEASUREMENT OF A FORCE /17H MOVED THROUGH A
     29HDISTANCE  51H -USING A CART, A PULLEY OR BY LIFTING THE OBJECTS
     39HDIRECTLY.  //48H YOUR CHILD IS ABLE TO USE THE CONCEPT OF VARIAB
     46HLES TO   52H DETERMINE WHICH VARIABLES CHANGE AND WHICH ONES ARE
     5/ 61H HELD THE SAME AND ELIMINATE UNNECESSARY VARIABLES WHEN MEASU
     611HRING WORK. )
   9 FORMAT(55HOYOUR CHILD IS ABLE TO MEASURE INPUT AND OUTPUT WORK.  )
  10 FORMAT(55HOYOUR CHILD IS ABLE TO AVERAGE A SERIES OF NUMBERS.  )
  11 FORMAT (53HOYOUR CHILD IS ABLE TO MEASURE THE FORCE OF FRICTION.//
     163H YOUR CHILD IS ABLE TO AVERAGE READINGS TO OBTAIN MORE ACCURATE
     29H RESULTS.//50H GIVEN A SYSTEM WITH WHICH HE IS FAMILIAR YOUR CHIL
     350HLD CAN IDENTIFY VARIABLES AND PREDICT HOW CHANGING  /8H VARIABL
     429HES WILL INFLUENCE THE SYSTEM. )
  12 FORMAT(1HO,52HYOUR CHILD IS ABLE TO MEASURE POTENTIAL ENERGY OF OB
     124HJECTS IN THE LABORATORY.//34H YOUR CHILD IS ABLE TO TRANSFER EN
     222HERGY USING A SPINIGIG.//36H YOUR CHILD IS ABLE TO MEASURE THE M
     363HECHANICAL ENERGY OF A SPINIGIG INDIRECTLY BY MEASURING THE POTE
     45HNTIAL /46H ENERGY GAINED AT THE OUTPUT END OF A SYSTEM.  )
  13 FORMAT(56HOYOUR CHILD IS ABLE TO MEASURE KINETIC OR POTION ENERGY
     155H INDIRECTLY BY MEASURING THE WORK DONE BY A MOVING BODY,/5H CORR
     224HECT TO .5 NEWTON METERS.//34H YOUR CHILD IS ABLE TO MEASURE THE
     363H CHANGE IN THE SPEED OF A SPINIGIG SYSTEM WHEN THE MASS IS CHAN
     44HGED.//55H GIVEN A SPINIGIG SYSTEM IN WHICH THE INPUT WORK CHANGE
     552HS YOUR CHILD IS ABLE TO MEASURE THE CHANGE IN SPEED.  )
  14 FORMAT(56HOYOUR CHILD IS ABLE TO MEASURE SPRING POTENTIAL ENERGY B
     151HY MULTIPLYING THE AVERAGE FORCE OF THE SPRING TIMES/9H THE DIST
     233HANCE THE END OF THE SPRING MOVES.//25H GIVEN A SYSTEM WITH WHICH
     363HH HE IS FAMILIAR YOUR CHILD IS ABLE TO IDENTIFY A TEMPERATURE C
     419HHANGE AS THE RESULT/40H OF ENERGY LOST FROM THE SYSTEM DUE TO F
     58HRICTION.  )
  15 FORMAT('OYOUR CHILD IS ABLE TO TRACE THE PATH OF ENERGY THROUGH A
     1SYSTEM WITH WHICH HE IS FAMILIAR, IDENTIFYING THE'/' ENERGY SUPPLI
     2ER, ENERGY RECIEVER AND THE KIND OF ENERGY PRESENT AT ANY POINT IN
     3THE SYSTEM.'/'OGIVEN A SYSTEM WHICH CONTAINS ONE OF THE FOLLOWING-
     4 GRAVITATIONAL POTENTIAL ENERGY, KINETIC ENERGY OR WORK'/' YOUR CH
     5ILD IS ABLE TO CALCULATE THE ENERGY OR WORK AND ACCOUNT FOR ANY LO
     6SS DUE TO FRICTION.')
  16 FORMAT('OYOUR CHILD IS ABLE TO GIVE THE OPERATIONAL DEFINITION OF
     1CHEMICAL CHANGE AS A CHANGE IN SUBSTANCE'/' IN WHICH SOME FORM OF
     2ENERGY IS RELEASED, AND CHOOSE FROM THE MATERIALS AVAILABLE IN THE
     3 CLASSROOM'/' AN EXAMPLE WHICH ILLUSTRATES THE DEFINITION.')
  17 FORMAT('OYOUR CHILD IS ABLE TO ILLUSTRATE THE CONCEPTS OF OPEN AND
     1 CLOSED CIRCUIT.'/'OGIVEN EQUIPMENT WITH WHICH HE IS FAMILIAR YOUR
     2 CHILD IS ABLE TO CONNECT COMPONENTS TO MAKE A SERIES OR'/' PARRAL
     3LEL CIRCUIT AND DESCRIBE ITS CHARACTERISTICS.'/'OYOUR CHILD IS ABLE
     4E TO DEMONSTRATE THAT ENERGY LOST FROM AN ELECTRICAL CIRCUIT'/' DUE
     5E TO RESISTANCE IS CONVERTED TO HEAT.'/'OYOUR CHILD CAN DEMONSTRAT
     6E THAT A WIRE CARRYING ELECTRICAL ENERGY GENERATES A MAGNETIC FIEL
     7D.')
```

```
 18 FORMAT('0YOUR CHILD IS ABLE TO OPERATIONALLY DEFINE A SCIENTIFIC M
    1ODEL.'/'0USING THE OPERATIONAL DEFINITION OF AMODEL YOUR CHILD IS
    2ABLE TO DETERMINE IF SIMPLE MODELS OF FAMILIAR SITUATIONS ARE VALI
    3D.'/'0YOUR CHILD IS ABLE TO USE A SIMPLE MODEL OF ELECTRICITY TO EX
    4XPLAIN HIS OBSERVATIONS OF ELECTRICAL CIRCUITS.')
 19 FORMAT('0YOUR CHILD IS ABLE TO IDENTIFY OBJECTS WHICH PRODUCE RESIS
    1STANCE IN A CIRCUIT'/' BY MEASURING THE CHANGE IN CURRENT IT CAUSES
    2S.'/'0YOUR CHILD CAN SET UP AN ELECTRICITY MEASURER AS A VOLTMETER
    3 .')
 20 FORMAT('0YOUR CHILD IS ABLE TO MEASURE ELECTRICAL ENERGY CORRECT T
    1O + OR - .1 VOLTS.'/'0YOUR CHILD IS ABLE TO MEASURE CURRENT CORRECT
    2T TO + OR - .1 AMPS.'/'0GIVEN A SYSTEM WITH WHICH HE IS FAMILIAR YOU
    3UR CHILD IS ABLE TO MEASURE TOTAL ELECTRICAL ENERGY IN NEWTON-METER
    4RS'/' BY MULTIPLYING VOLTS BY AMPS BY SECONDS.')
 99 FORMAT (1HO,43HYOUR CHILD HAS MADE NO MEASURABLE PROGRESS. )
    END
```

Appendix C

Individual Report of Accomplishments in Science
Sample Printouts

WILLIAMSPORT AREA SCHOOL DISTRICT
ROOSEVELT JUNIOR HIGH SCHOOL

INDIVIDUAL REPORT OF ACCOMPLISHMENTS IN SCIENCE

TO THE PARENTS OF LENTZ RC

THE FOLLOWING IS A LISTING OF BRIEF SUMMARIES OF THE WORK DONE AND ABILITIES GAINED BY YOUR CHILD DURING THE PREVIOUS MARKING PERIOD. 1774

YOUR CHILD IS ABLE TO MEASURE POTENTIAL ENERGY OF OBJECTS IN THE LABORATORY.

YOUR CHILD IS ABLE TO TRANSFER ENERGY USING A SPINIGIG.

YOUR CHILD IS ABLE TO MEASURE THE MECHANICAL ENERGY OF A SPINIGIG INDIRECTLY BY MEASURING THE POTENTIAL ENERGY GAINED AT THE OUTPUT END OF A SYSTEM.

YOUR CHILD IS ABLE TO MEASURE KINETIC OR MOTION ENERGY INDIRECTLY BY MEASURING THE WORK DONE BY A MOVING BODY, CORRECT TO .5 NEWTON METERS.

YOUR CHILD IS ABLE TO MEASURE THE CHANGE IN THE SPEED OF A SPINIGIG SYSTEM WHEN THE MASS IS CHANGED.

GIVEN A SPINIGIG SYSTEM IN WHICH THE INPUT WORK CHANGES YOUR CHILD IS ABLE TO MEASURE THE CHANGE IN SPEED.

YOUR CHILD IS ABLE TO MEASURE SPRING POTENTIAL ENERGY BY MULTIPLYING THE AVERAGE FORCE OF THE SPRING TIMES THE DISTANCE THE END OF THE SPRING MOVES.

GIVEN A SYSTEM WITH WHICH HE IS FAMILIAR YOUR CHILD IS ABLE TO IDENTIFY A TEMPERATURE CHANGE AS THE RESULT OF ENERGY LOST FROM THE SYSTEM DUE TO FRICTION.

WILLIAMSPORT AREA SCHOOL DISTRICT
ROOSEVELT JUNIOR HIGH SCHOOL

INDIVIDUAL REPORT OF ACCOMPLISHMENTS IN SCIENCE

TC THE PARENTS OF DOUGHERTY MM

THE FOLLOWING IS A LISTING OF BRIEF SUMMARIES OF THE WORK DONE AND ABILITIES GAINED BY YOUR CHILD DURING THE PREVIOUS MARKING PERIOD. 2277

YOUR CHILD IS ABLE TO TELL IF A TEST BATTERY WHICH HE MADE IN CLASS HAS INFLUENCE BY TESTING IT IN A SIMPLE CIRCUIT.

YOUR CHILD IS ABLE TO DESCRIBE SIMPLE GROUPS OF OBJECTS WHICH WORK TOGETHER AS A SYSTEM AND IDENTIFY SUBSYSTEMS AND COMPONENTS.

YOUR CHILD IS ABLE TO ADD, SUBTRACT, MULTIPLY AND DIVIDE DECIMAL NUMBERS.

YOUR CHILD IS ABLE TO MEASURE DISTANCES USING METRIC UNITS CORRECT TO .3 CENTIMETERS.

YOUR CHILD IS ABLE TO WRITE AN OPERATIONAL DEFINITION --ONE WHICH SHOWS MEASUREMENT OF THE THING BEING DEFINED.

YOUR CHILD IS ABLE TO ANSWER QUESTIONS ABOUT RELATIONSHIPS SHOWN IN A DATA TABLE.

YOUR CHILD IS ABLE TO GRAPH DATA FROM A DATA TABLE.

WILLIAMSPORT AREA SCHOOL DISTRICT
ROOSEVELT JUNIOR HIGH SCHOOL

INDIVIDUAL REPORT OF ACCOMPLISHMENTS IN SCIENCE

TO THE PARENTS OF BEATTIE TP

THE FOLLOWING IS A LISTING OF BRIEF SUMMARIES OF THE WORK DONE AND ABILITIES GAINED BY YOUR CHILD DURING THE PREVIOUS MARKING PERIOD. 4246

YOUR CHILD IS ABLE TO MEASURE FORCES BY APPLYING THE OPERATIONAL DEFINITION OF FORCE.--ANYTHING WHICH CHANGES THE SHAPE OR MOTION OF AN OBJECT.

YOUR CHILD IS ABLE TO MEASURE FORCES IN NEWTONS--THE METRIC UNIT OF FORCE.

YOUR CHILD IS ABLE TO CALIBRATE A SIMPLE FORCE MEASURING DEVICE SIMILAR TO THE ONE HE USED IN CLASS.

YOUR CHILD IS ABLE TO MEASURE WORK, WHICH IS OPERATIONALLY DEFINED AS THE MEASUREMENT OF A FORCE MOVED THROUGH A DISTANCE --USING A CART, A PULLEY OR BY LIFTING THE OBJECTS DIRECTLY.

YOUR CHILD IS ABLE TO USE THE CONCEPT OF VARIABLES TO DETERMINE WHICH VARIABLES CHANGE AND WHICH ONES ARE HELD THE SAME AND ELIMINATE UNNECESSARY VARIABLES WHEN MEASURING WORK.

YOUR CHILD IS ABLE TO MEASURE INPUT AND OUTPUT WORK.

YOUR CHILD IS ABLE TO AVERAGE A SERIES OF NUMBERS.

YOUR CHILD IS ABLE TO MEASURE THE FORCE OF FRICTION.

YOUR CHILD IS ABLE TO AVERAGE READINGS TO OBTAIN MORE ACCURATE RESULTS.

GIVEN A SYSTEM WITH WHICH HE IS FAMILIAR YOUR CHILD CAN IDENTIFY VARIABLES AND PREDICT HOW CHANGING VARIABLES WILL INFLUENCE THE SYSTEM.

Appendix D

Cover Letter and Questionnaire

WILLIAMSPORT AREA SCHOOL DISTRICT

THEODORE ROOSEVELT JUNIOR HIGH SCHOOL
800 West Fourth Street
Williamsport, Pennsylvania 17701

March 15, 1974

Dear Parents:

During this school year in addition to the letter grade your child received in science on the regular report card, additional reports were sent home at grading time. Attached is a questionnaire which, we hope, will help us tell how you feel about these reports. Please take a moment to read and complete this short form. Feel free to add any personal comments on the back of the questionnaire.

We wish to emphasize that the information from the questionnaire will in no way influence your child's grade. We are only seeking your opinion about additional reporting. You need not sign the questionnaire. However, each child will be asked to turn in a completed questionnaire.

Please accept our sincere thank you for your cooperation.

Sincerely yours,

Jay F. Livziey

H. V. Bardsley

D. W. Beeling

Williamsport Area School District
Roosevelt Junior High School

Additional Reporting Questionnaire

Please circle the letter or letters which stand for the word or phrase which is closest to your feelings about the sentence to the right of the letters. SA - Strongly Agree, A - Agree, U - Undecided, D - Disagree, SD - Strongly Disagree.

(SA) A U D SD - Ex: Dogs are man's best friend.

SA A U D SD - 1. Because of the reports sent home I feel I know more about what my child is learning in science than I would without them.

SA A U D SD - 2. I feel the reports in science have been helpful to me in understanding my child's work habits.

SA A U D SD - 3. I would like to receive reports about my child's work habits in other subject areas.

SA A U D SD - 4. The individualized reports have not helped me understand my child's accomplishments in science.

SA A U D SD - 5. Because of the reports sent home I had more information about work habits which I could discuss with my child.

SA A U D SD - 6. I dislike the science program my child has this year.

SA A U D SD - 7. Because of the reports sent home I talked to my child about the amount of work he or she was doing in science more than I would have without them.

SA A U D SD - 8. If I had another child in seventh grade next year I would like to receive reports of his work in science similar to this year's reports.

SA A U D SD - 9. Because of the reports sent home I talked to my child about the things he or she learning more than I would have without them.

SA A U D SD - 10. The individualized reports have been helpful to me in understanding my child's accomplishments in science.

SA A U D SD - 11. I feel the reports in science have not been helpful to me in understanding about my child's work habits.

SA A U D SD - 12. I would like to receive reports about the work my child has accomplished in other subject areas.

SA A U D SD - 13. Since the reporting forms and their completion cost money, they should be discontinued because they probably cost more than they are worth.

Appendix E

Raw Data Tables

Number of Responses per
Category for the Treatment Group

Statement Number	SA	A	U	D	SD
1.	38	80	7	10	4
2.	27	87	14	7	1
3.	56	59	15	6	0
4.	2	16	15	70	36
5.	20	92	17	8	2
6.	9	9	29	65	41
7.	12	83	15	13	2
8.	35	91	16	6	3
9.	14	88	9	25	1
10.	22	84	13	17	3
11.	5	15	17	77	27
12.	31	80	17	7	3
13.	6	11	33	55	33

Number of Responses per
Category for the Control Group

Statement Number	SA	A	U	D	SD
1.	20	54	19	6	4
2.	16	62	15	5	2
3.	33	48	9	2	2
4.	2	11	16	44	12
5.	14	69	13	6	2
6.	3	8	25	33	26
7.	10	55	15	16	2
8.	25	60	12	6	4
9.	14	52	19	9	2
10.	8	62	17	16	37
11.	4	8	15	43	19
12.	25	53	10	4	2
13.	6	10	18	25	23